

Outputs & Best Practices from 2013 Industrial Water Assessments



Water Preservation and Pollution Prevention Program

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Goals & Objectives of the WP4 Program

1) Update essential water program related information

- Sewer Diagrams – Process, Sanitary, and Storm lines
- Inventory of Water Users – Water Process Flow Diagram
- Overall water balance for each facility

2) Identify potential water conservation projects

- Calculate annual water savings
- Estimate cost of implementation
- Determine payback period - ROI

3) Identify pollutant reduction projects

- Priority focus on compliance parameters of concern
- Source controls, rather than end-of-pipe WWT
- Additional cost savings opportunities – chemical usage / energy usage



Participants

1) Delta Faucet – Greensburg

- Contact: Luke Fullenkamp
- Multiple plating lines
- WWT - Metals precipitation



2) Mead Johnson Nutrition – Evansville

- Contact: Chris Allen
- Infant & Adult Formula
- WWT – pH Adjustment



3) SABIC Innovative Plastics – Mt. Vernon

- Contact: Nicholas George
- LEXAN Resin Compounding & Pelletizing
- WWT – Dissolved Air Floatation

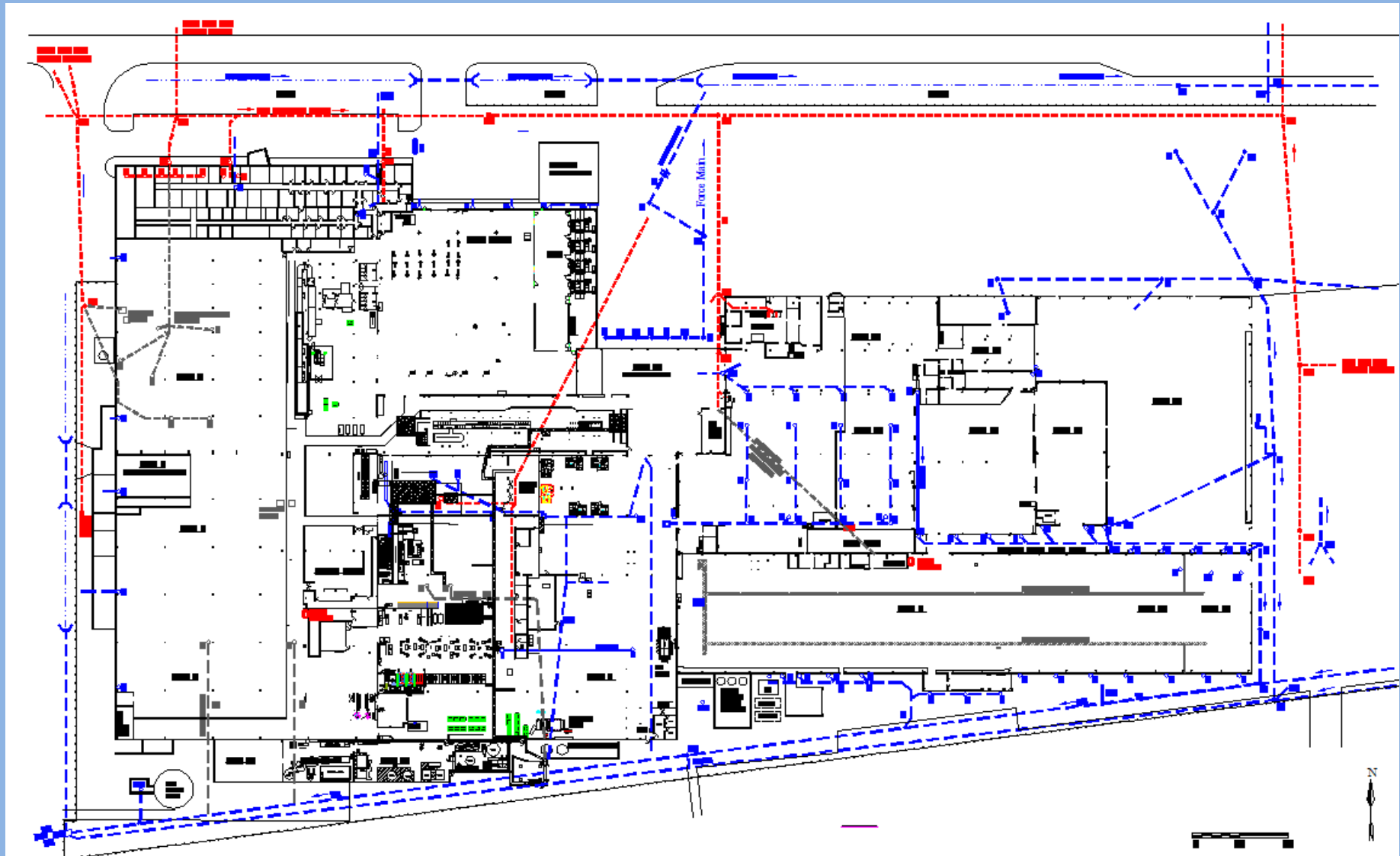


4) Red Gold – Elwood

- Shane Wingler
- Tomato Processing – Ketchup & Sauce
- WWT – Dissolved Air Floatation & Activated Sludge

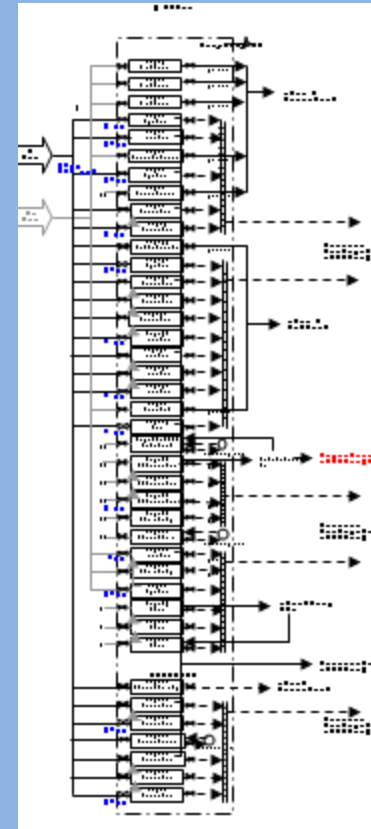
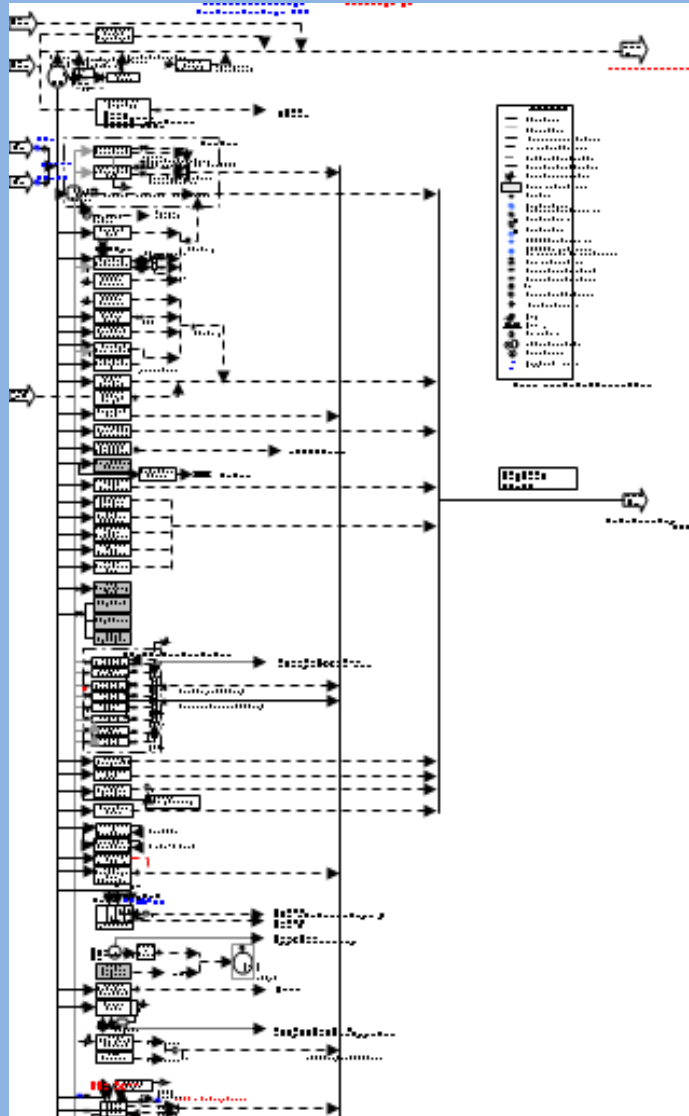


Deliverables Package – Sewer Diagrams



Updated mapping with inspection findings
(multi-layered AutoCAD drawing)

Deliverables Package – Water PFD



Depicts all incoming water supplies, users, WW generators, and WWT
(MS Excel)

Example - Water / Energy Conservation Project

- Reduce NCCW water use on vacuum pumps.

Opportunity: Install flow control orifices on supply lines – 9 missing. Also check to ensure solenoid valves are working properly.

Result:

- Reduced mill water use by 9pumps * 7gpm * 1440min/d reduction * 365d * 70%
= 23,100,000gpy (at \$1.44/1000gal cost savings **\$33,264/yr**)



No Orifice – 10gpm



With Solenoid & Orifice
<5gpm, and flow stops when
pump stops.

Example - Water / Energy Conservation Project

- Reduce / Eliminate RO Storage Tank Overflows

Opportunity:

Overflows result in 80gpm of lost RO water. Overflow pipe was hard-piped to sewer and therefore difficult to detect flow during process walk-throughs.

Result:

- Adjusted tank high-level set-point downward by 8%
- Reduced RO water losses

= 31,500,000 gal/yr RO (@ \$4.50/1000gal = \$136,800)



Example - Water / Energy Conservation Project

- Evaluate and Adjust RO Water Flows on OQ Pellet Washers (5)

Opportunity:

Determine proper flow ranges and adjust set-points. During WP4 event, one washer was running at 25gpm while others were only 5gpm.

Result:

- Reduce RO water use on at least 1 OQ pellet washer.

(13gpm * 1440min/day * 365 d * 90% uptime) =

= 6,100,000 gal/yr RO

= \$35,100 / yr



Example - Water / Energy Conservation Project

- Reuse of Reverse Osmosis (RO) Reject Water

Opportunity:

Replace carbon steel recirculation pipeline with c-PVC pipe, to avoid past corrosion issues. Options include OQ Blob cooling, OQ vacuum pump cooling (4).

Result:

- Reduced mill water use ($20\text{gpm} * 75\% \text{ uptime} * 1440\text{min/day} * 365\text{days}$)
= 7,900,000 gal/yr = \$11,400/yr



Other Potential Opportunities for Reuse of RO Reject Water

- Cooling Water (e.g. cooling tower make-up, quench water, & once-thru) (All)
- Equipment and/or floor wash-downs (MJN)
- Chemical make-down systems (Red Gold)
- Lawn Irrigation (MJN)



Example - Water / Energy Conservation Project

- Reconnect steam condensate collection tank to site recovery/return system.

Opportunity: Replace failed pump and re-pipe to nearby return tank system.

Result:

- Reduced mill water use = **5,256,000 gal/yr MW**
- Heat and chemical recovery = **\$40,000 / yr**



Other Opportunities

Delta Faucet	1) Consider using raw city water, rather than soft water, as back-up to RO concentrate on air scrubbers.	a) Measure current soft water usage on air scrubbers to quantify the opportunity. b) If attractive, simply switch break tank controllers between soft and city water.
Mead Johnson Nutrition	1) Eliminate RO purges passing through conductivity probes	Measured $4\text{gpm} \times 1440\text{min/d} \times 365 \times 0.8$ (on-line percentage) = 1.7 MMgal/yr
	2) Eliminate CW Purges passing through pH probes	Measured $1\text{gpm} \times 1440\text{min/d} \times 365 \times 0.8$ (on-line percentage) = 0.4 MMgal/yr
Red Gold	1) Reduce/Control Pump Seal Water by 95% (from 1 to 0.05gpm)	$45 \text{ total pumps} \times .95 \text{ gpm} \times 1440\text{m/d} \times 5 \text{ d/wk} \times 52 \text{ wk/yr} = \mathbf{16.0 \text{ MMgal/yr}}$
	2) Reduce/Control Flow through Vacuum Pumps by 70% (10 to 3gpm)	$6 \text{ pumps} \times 7\text{gpm} \times 1440 \times 5 \times 52 \times 0.8 = \mathbf{12.6 \text{ MMgal/yr}}$
	3) Adjust RO Systems to achieve 75% permeate production (currently 60%)	$2 \text{ units} \times 2.5\text{gpm} \times 1440 \times 5 \times 52 \times 0.5 = \mathbf{0.9 \text{ MMgal/yr}}$

Results Summary



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Environmental Health & Safety Compliance Experts



Grant-Funded Water Management Pilot Program RESULTS!

SES was selected by the Indiana Department of Environmental Management's (IDEM's) Office of Compliance Support to work directly with manufacturing facilities to assess ways in which to reduce unnecessary water consumption, waste and costs.

Identified
Reductions



Water Usage (gallons/yr)	TBD	100,000,000	22,700,000	43,800,000
Wastewater (gallons/yr)	TBD	100,000,000	22,400,000	43,800,000
Waste to Landfill (pounds/yr)	0	90,000	0	0
Total Potential Annualized Cost Savings (\$/yr)	TBD	\$563,657	\$140,930	\$463,047

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Q & A